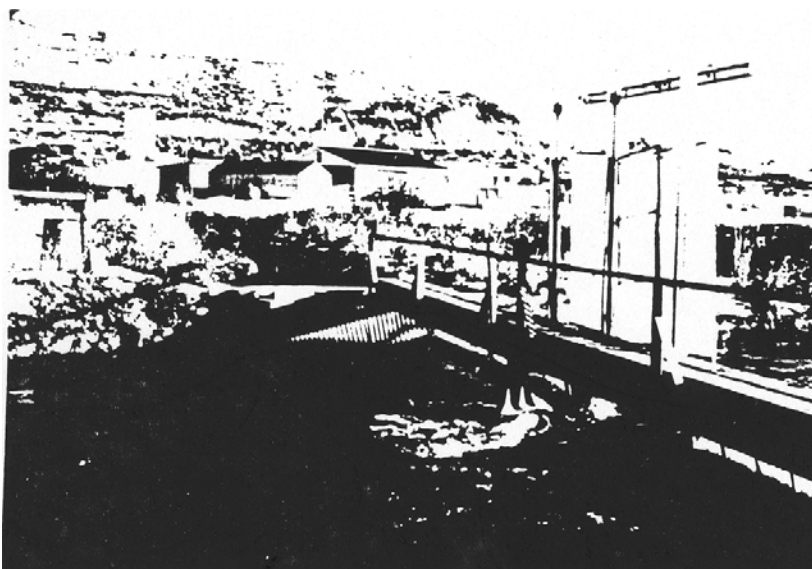




# **PAHSIMEROI FISH HATCHERY**

**1996 Summer Chinook Brood Year Report**



by

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## ABSTRACT

The Pahsimeroi river weir was installed on July 2, 1996 and remained in place through October 1, 1996. Trapping began July 5 and continued through October 1. The first fish trapped was on July 11, and the last was trapped on September 24. A total of 89 chinook salmon *Oncorhynchus tshawytscha* were trapped during the 1996 brood year (9 jacks, 49 adult males, and 31 females). Of the 89 fish trapped 51 were released back into the Pahsimeroi for natural spawning and 38 were retained in holding for Pahsimeroi Fish Hatchery (PFH) production.

Fish released into the Pahsimeroi River for natural spawning consisted of 13 unmarked females, 32 unmarked males, 2 left ventral (LV) clipped adult males, and 4 unmarked jacks. Fish held for PFH production consisted of: 16 adipose (AD) clipped and 2 (LV) clipped females, 14 AD clipped, one LV-clipped adult males, and 5 right ventral (RV) clipped jacks.

Chinook salmon spawning commenced on August 26, 1996 and concluded on October 1, 1996. From the 18 females spawned, 85,660 green eggs were taken. Average fecundity was 4,758 eggs per female. An eye up percentage of 93.56% gave us 80,143-eyed eggs.

Starting on April 15, 1998 outlet screens of rearing pond 2 were removed to allow volitional releases of chinook smolt into the Pahsimeroi River. There were 65,648 smolts released averaging 11./lb for a total of 5,914 lbs. For two weeks water flow through the pond was manipulated to trigger fish migration. By May 4 all smolts had left the pond and the pond was dewatered.

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## **INTRODUCTION**

Pahsimeroi Fish Hatchery (PFH) is located on the Pahsimeroi River, one mile upstream from its confluence with the Salmon River near the town of Ellis, Idaho. Two rearing ponds are located at a separate location seven miles further upstream on the Pahsimeroi River. The PFH was constructed in 1967 by Idaho Power Company (IPC) and is owned and funded by IPC. THE PFH operations and management is the responsibility of the Idaho Department of Fish and Game (Department). The summer chinook program is IPC's mitigation obligation for the three dams constructed on the Hells Canyon Reach of the Snake River.

## **OBJECTIVES**

Mitigation goals for the PFH are for summer chinook salmon and for A-run steelhead. Objectives of the PFH are:

1. Rear one million summer chinook smolts for release into the Pahsimeroi River.
2. Trap and spawn adult chinook returning to the PFH to produce one and a half million green summer chinook eggs.
3. Trap adult steelhead and produce one and a half million steelhead eggs, incubate to the eyed stage, and transport to Niagara Springs Hatchery for rearing to smolt size.
4. Work with management, research, and IPC to identify optimum operating procedure, rearing strategies, and develop the facility to maximize survival, fish health, and genetic diversity.

## **HATCHERY FACILITIES**

The PFH is split into two locations. The main site consists of six buildings, two of which are residences for the full-time employees (one 1994 wood-frame home and one 1976 doubled wide mobile home). The third building is a combination garage, shop, and two-bedroom living quarters for temporary employees. The fourth contains the office, public rest rooms, and an incubation room. The storage building consists of two sections: one for chemical and machinery storage, the other for non-chemical equipment storage. The final building is the spawning building. The upper site consists of a garage/shop, walk in freezer, and a 7 ft X 10 ft storage shed.

The fish production facilities include:

**The main facility:**

1. Removable weir across the Pahsimeroi River.
2. Fish ladder, trap, and holding ponds. The three ponds are 70 ft x 16 ft x 6 ft each. Two are for holding, the center one is considered the trap.
3. Four raceways (100 ft x 4 ft x 3 ft - l x w x d) with river water supply and limited (200-gpm) spring water supply.
4. Incubation room with 20 stacks of 16-trays of *Heath tray* vertical flow incubators supplied by pumped spring water or pumped river water.

**The upper facility:**

1. Two 300 ft x 40 ft x 5 ft gravel and dirt rearing ponds supplied with Pahsimeroi River water.
2. Two 300 ft x 40 ft x 4 ft dirt settling ponds located directly below the rearing ponds.

Holding capacity for the trap and holding ponds is approximately 2,000 adult chinook and 5,000 adult A-run steelhead. Raceways can hold over one million two-inch chinook fry at a .30 density index when using 3 cubic feet per second (cfs) of river water. When using only the clean, disease free, spring water this drops to 145,000 two-inch chinook fry. Holding capacity in the two-rearing ponds at the upper facility with an inflow of 20 cfs is 1,000,000 chinook smolts.

## **WATER SUPPLY**

Incubation water consists of specific pathogen free (SPF) spring water, which is pumped to a 10,000 gallon holding tank and gravity fed to the incubators. It may also be gravity fed to one early-rearing raceway. The spring source can produce up to 200 gallons/min (gpm) of 55°F to 57°F water.

The adult trap and holding ponds are supplied from the Pahsimeroi River through a 1/4 mile long earthen intake canal. Water from the canal may also be used to supply the early-rearing raceways. A water right of 40 cfs for the PFH gives us the ability to divert water from the Pahsimeroi River into the canal. Water quality varies throughout the year. Water temperatures vary from seasonal lows of 33°F in the winter to seasonal highs of 72°F in the summer months. Daily fluctuations can be as high as 12°F.

Water for the rearing ponds comes from a diversion out of the Pahsimeroi River. A water right for 20 cfs allows for a flow of 10 cfs per pond. The water is diverted down a concrete canal, flows through the ponds and into the settling pond before being discharged back to the Pahsimeroi River.

## **STAFFING**

The PFH is staffed with two permanent employees: A Hatchery Manager 1 and an Assistant Hatchery Manager. In addition, there are three temporary employees to assist during the steelhead and chinook trapping and spawning seasons. The temporary positions consist of two bio-aides and one laborer position.

Also, at the height of the steelhead and chinook spawning season we are assisted by Idaho Fish and Game regional staff, Department's Sawtooth Fish Hatchery staff, and one fishery technician from Department's Nampa Fisheries Research office who operates the screw trap. A three-year average of additional manpower was 1,140 man-hours for the period of March 1 through October 15. The estimated cost for this additional manpower was \$16,780 annually.

## **TRAPPING AND SPAWNING**

The weir was installed on July 2, 1996 and trapping began on July 5. Trapping continued through October 1, 1996. The first chinook was trapped on July 11, and the last on September 24, 1996 (Appendices A, B). The peak of the run was difficult to determine. The number of fish trapped was low and a consistent number was trapped daily throughout July, with no distinct peak observed. The highest daily number trapped (six) was on July 29. The small surge of fish that arrived the first week of September could be considered a separate group, possibly making the run bi-modal ( Appendix B ).

Returning summer chinook consists of three year classes: (BY) 1991, 1992, and 1993. The PFH fish from these age groups were marked with an AD clip in 1991, a LV clip in 1992, and right ventral (RV) clip in 1993. All natural chinook were not marked. Of the 127,677 coded-wire tagged (CWT) fish from BY91 (released in 1993) returning as five-year-olds, no CWT detections were made. Additionally, of the 1,000 Passive Integrated Tagged (PIT) fish from BY92 (released in 1994) and 1,000 PIT tagged fish from BY93 (released in 1995), no PIT tags were detected in the fish returning in 1996.

There were 89 chinook trapped during the period of July 5, 1996 to October 1, 1996: 9 jacks (4 natural and 5 hatchery), 49 adult males (32 natural and 17 hatchery), 31 females (13 natural and 18 hatchery). There were 13 unmarked females; 32 unmarked adult males, 2 (LV) clipped adult males, and 4 unmarked jacks released upstream of the Pahsimeroi weir for natural spawning (Appendix A). There was no pre-spawning mortality in 1996. Length frequency information may be found in appendices C and D. The fish held for spawning and hatchery production consisted of 16 (AD) clipped and 2 (LV) clipped females, 14 (AD) clipped, one (LV) clipped, and 5 (RV) clipped males.

Scales samples were taken from all fish that were trapped. Scales will be used to reassess the age-length criteria. The use of length to determine age has been in question over the past few years because known age groups did not match the size classification especially in the five-year old class. In 1995 and in 1996 most fish (98%) classified as five-years olds, using the length criteria, were actually four-year olds as determined by fin clip and tag types.

Summer chinook spawning began on August 26, 1996 and concluded on October 1, 1996. A total of 18 females were spawned for 85,660 green eggs. Fecundity averaged 4,758 eggs per

female. The dead egg pick-off was 5,517 ,yielding 80,143 eyed eggs. The eye-up percentage was 93.56% (Appendix E). At eye-up, 77,900 eggs were shipped to Sawtooth Hatchery for hatching and early rearing on Specific Pathogen Free (SPF) spring water, known to not contain the whirling disease causative agent.

A total of 2,243 eggs (from one female) which exhibited symptoms of soft shell disease were retained at PFH and allowed to hatch prior to shipment to Sawtooth as swim-up fry.

Females were sorted twice a week for ripeness. Ripe fish were killed by a blow to the head. Females were then suspended from a hook, and dry-spawned by incision. The eggs were collected in a colander to drain the ovarian fluid. A one-cc sample of ovarian fluid was retained from each female for virology testing. The eggs were then placed into a spawning bucket, and the sperm from two males was added. This 2:1 male to female ratio was used to insure fertilization. During the early spawn takes, there were relatively few ripe males available, so some males were used more than once throughout the spawning season.

The eggs were then hand stirred. Spring water was added to activate the sperm, the eggs were stirred again and allowed to sit for five minutes. After five minutes the eggs were rinsed with spring water and a 100-ppm iodine solution was added to the eggs. The eggs were allowed to sit in the iodophor solution for 30 minutes for pathogen control and water hardening. After 30 minutes the iodophor solution was rinsed out and well water added. The eggs were allowed to sit in the well water for 30 minutes to complete water hardening.

The eggs were then loaded into the incubator trays at the rate of one female's eggs per tray. They were left undisturbed for a minimum of 48 hours. From 48 hours after fertilization until eye-up, the eggs received a daily 15 minute, 1,667 ppm formaldehyde solution flow through treatment to prevent fungus growth.

The first lot of eggs eyed up on September 17 and the final lot on October 21. At eye-up, the dead eggs were hand picked. The good eggs were then enumerated with a Jensorter electronic egg counter. The dead eggs count was then added to the live egg count to obtain the total number of green eggs per female. The dead/live egg count was then divided by the total egg count to obtain the percent survival to eye up.

Ovarian fluid and kidney samples were collected from all females spawned. These samples were used to test for virus and bacterial kidney disease (BKD) respectively. Kidney samples were analyzed via the enzyme-linked immunosorbant assay (ELISA) technique for BKD.

Of the 18 kidney samples analyzed for BKD, five tested low positive for BKD, and 14 tested negative. No samples tested intermediate or high positive. All ovarian fluid samples tested negative for virus. No culling was done.

Head wedge samples were also obtained from all females spawned to test for whirling disease spores. Only one sample tested positive.

## **FISH PRODUCTION**

A total of 75,502 swim-up fry were ponded in early rearing vats at Sawtooth Fish Hatchery during the months of December 1996 and January 1997. These vats were fed with SPF water. The fry were started on BioDiet #2 starter.

On December 24, a fish loss of 8,400 swim-up fry occurred during initial ponding in fry tanks. It was felt that the cause was probably insufficient rinsing of disinfectant prior to ponding.

To prevent BKD, the fry received the first of two prophylactic medicated feed treatments during late May and early June 1997. A total of 221 pounds of 1.5 mm and 11 lbs of 2.5 mm feed containing erythromycin were fed. The second erythromycin feed treatment was administered in August 1997. The fish were fed a total of 792 lbs of medicated feed: 263 lbs of 2.5 mm Bioproducts grower, and 529 lbs of 3.0 mm Bioproducts grower.

Due to space and water limitations in the indoor nursery tanks, the fry were transferred to outdoor raceways supplied with river water during July 1997.

A total of 65,783 summer chinook pre-smolts were trucked to PFH and ponded in rearing pond #2 on October 22, 1997. The fish averaged 20/lb (5.1 inches) at ponding.

The fish received two feed treatments of oxytetracycline-one in November 1997 and one in April 1998 prior to release. A total of 2,114 lbs of 3.0-mm oxytetracycline feed were administered.

The PFH brood year 1996 smolts received were fed a total of 14,658 lbs of feed during their rearing cycle, resulting in a conversion of 2.50. A breakdown of quantity and cost of feed fed can be found in Appendix F. Pre-release organo-somatic indices may be found in Appendix G. Production costs are summarized in Appendix H. Losses and survival percentages by life stage are summarized in Appendix I.

## **FISH RELEASES**

The 65,648 smolts were released volitionally from April 15, 1998 to May 4, 1998. The outlet screens were pulled on April 15, 1998 and a set of dam boards was pulled each day thereafter until none remained in the outlet keyways. This increased turnover rate through the ponds, facilitating rapid outmigration. The smolts averaged 11.1/ lb (6.3 inches) at the time of release for a total weight of 5,914 lbs.

## **FISH HEALTH**

### **Diseases Encountered and Treatment**

Since most of the fish released from the PFH were reared at Sawtooth Hatchery until October 1997, most disease problems involving these fish were encountered in early rearing or after final ponding. Gas bubble trauma continues to be a problem during early rearing, due to total

gas pressure exceeding 103% after degassing. The IHNV was diagnosed in steelhead being utilized as sentinel fish in the raceways at the lower facility. These fish were destroyed. Before released, chinook were found to be carrying pseudomonads, aeromonads, and flexibacters. As the temperature became warm enough to treat, a standard oxytetracycline treatment was applied before release. Whirling disease will always be present as long as PFH utilizes untreated surface water and mud bottom ponds.

### **Acute Losses**

Acute losses were not experienced at this facility in the chinook, but the steelhead that were being used as sentinel fish did experience acute losses due to IHNV. Chronic losses of chinook were limited to various bacteria that were mentioned in the previous section.

### **Other Assessments**

The PFH needs to renovate the rearing facility by first developing well water sources for early and production rearing. Next, the PFH should replace pond rearing with circular tanks to accommodate small family rearing. If all of this cannot be done at PFH, then Hayden Creek Hatchery should be put back on line, the spring tapped (whirling disease is endemic to this site also) and the facility renovated to accommodate intensive rearing. This should give the PFH program adequate clean well water to produce healthy fish.

## **FISH MARKING**

All brood year 1996 fry received an AD clip on May 12 and 13, 1997. A hand count of fry obtained during clipping yielded a total of 66,085 fry on hand. Additionally, 1,000 fish were PIT tagged during March 1998.

## **HATCHERY IMPROVEMENTS**

New degassing towers were fabricated and installed in the egg room. As a result, total dissolved gas levels were reduced from 108% to 101%. New ball valves were installed in the south side of the egg room.

New, non-skid walkway grating was installed over the early rearing raceway headbox and tailrace areas. A degassing tower was plumbed in to early rearing raceway one to reduce total dissolved gas levels from 110% to 102%.

New furniture was purchased for the PFH dormitory. The dormitory also received a new coat of paint. New lighting fixtures were purchased and installed in the dormitory kitchen and bedroom areas.

A gravity feed emergency eye-wash station was installed in the chemical room. The chemical room was re-organized to provide additional storage area and quick access to the eye wash station if needed.

A compressed air supply line was installed in the PFH shop. Pneumatic tools were purchased and may be operated from the new supply line.

The large metal storage building at the upper facility received a new workbench and cabinets for tool/equipment storage. Also, the existing barbed-wire fence surrounding the upper facility was repaired. New metal fenceposts were installed where necessary and several railroad ties were installed to help stabilize the barbed wire fence.

### **ACKNOWLEDGMENTS**

The crew at PFH would like to express their appreciation to all those who helped with the spawning and transporting of steelhead and salmon. We would also like to thank Paul Abbott and the staff of Idaho Power Company for their continued help and support.

## **APPENDICES**

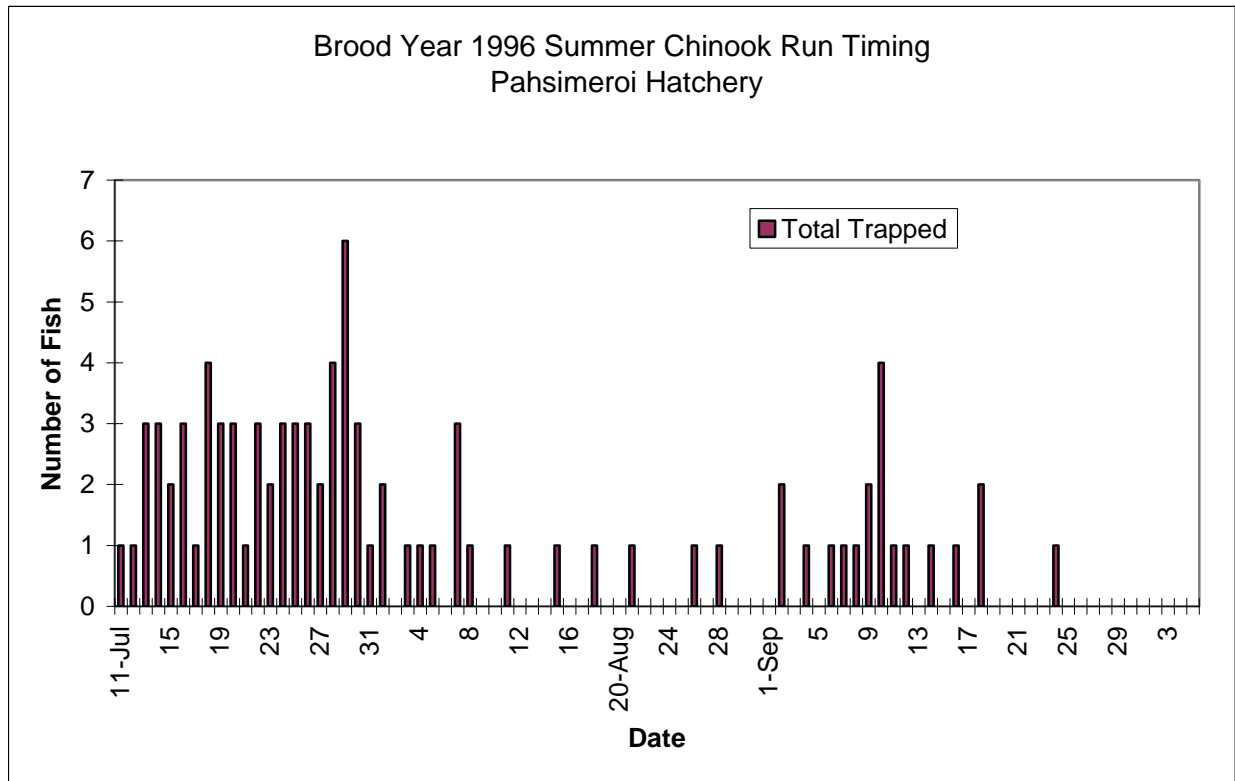
Appendix A. Pahsimeroi Fish Hatchery Brood year 1996 chinook salmon run timing.

Date Trapped	Total Trapped	Hatchery Males	Hatchery Females	Hatchery Jacks	Natural Males	Natural Females	Natural Jacks
11-Jul	1				1		
12	1					1	
13	3	1			2		
14	3	2	1				
15	2	1			1		
16	3	1			2		
17	1		1				
18	4	1			1	2	
19	3	1			1	1	
20	3				1	2	
21-Jul	1					1	
22	3		2		1		
23	2	2					
24	3	1	1		1		
25	3	1	1		1		
26	3		1		1	1	
27	2		1	1			
28	4	1	2			1	
29	6	1	3		1	1	
30	3	1	2				
31	1				1		
1-Aug	2			1	1		
2	0						
3	1				1		
4	1				1		
5	1		1				
6	0						
7	3		1	1		1	
8	1				1		
9	0						
10-Aug	0						
11	1	1					
12	0						
13	0						
14	0						
15	1		1				
16	0						
17	0						
18	1	1					
19	0						
20-Aug	0						
21	1			1			
22	0						
23	0						
24	0						

Appendix A. Pahsimeroi Fish Hatchery Brood year 1996 chinook salmon run timing  
(Continued).

Date Trapped	Total Trapped	Hatchery Males	Hatchery Females	Hatchery Jacks	Natural Males	Natural Females	Natural Jacks
24	0						
25	0						
26	1						1
27	0						
28	1				1		
29	0						
30-Aug	0						
31	0						
1-Sep	0						
2	2	1			1		
3	0						
4	1				1		
5	0						
6	1				1		
7	1						1
8	1					1	
9	2				2		
10-Sep	4			1	3		
11	1				1		
12	1					1	
13	0						
14	1				1		
15	0						
16	1						1
17	0						
18	2				2		
19	0						
20-Sep	0						
21	0						
22	0						
23	0						
24	1						1
25	0						
26	0						
27	0						
28	0						
29	0						
30	0						
1-Oct	0						
2	0						
3	0						
4	0						
5	0						
<b>Totals</b>	<b>89</b>	<b>17</b>	<b>18</b>	<b>5</b>	<b>32</b>	<b>13</b>	<b>4</b>

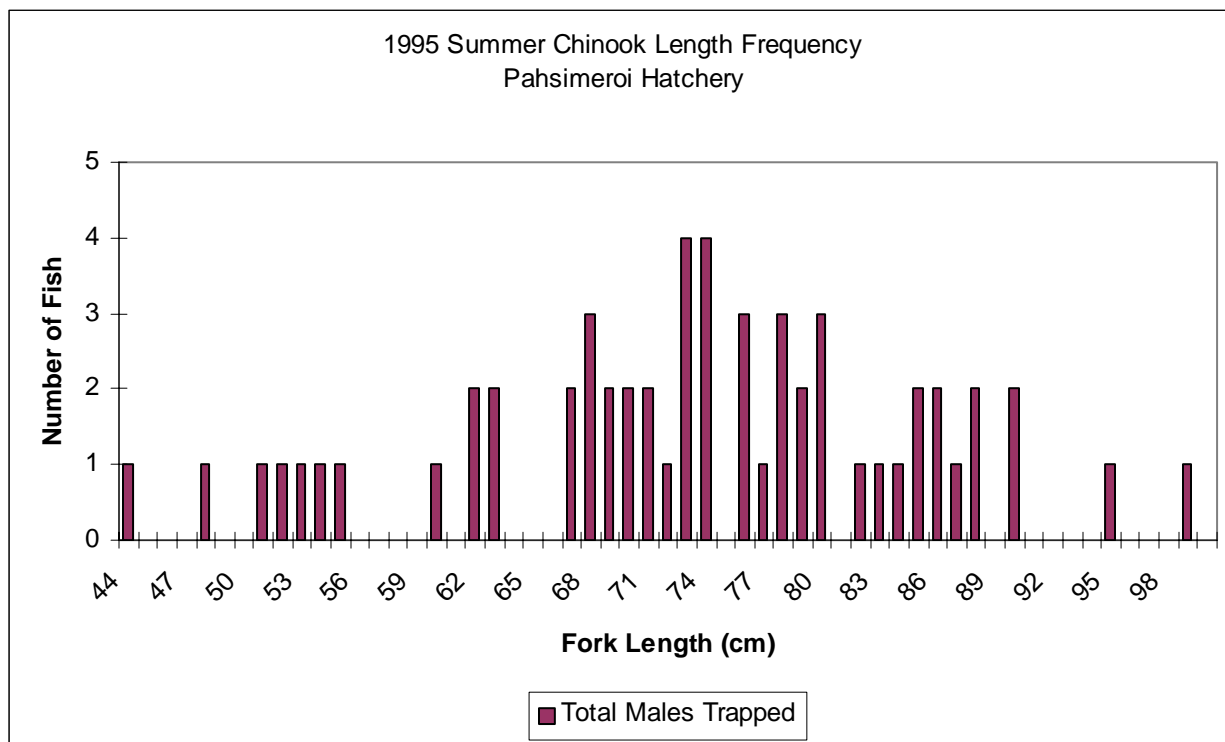
Appendix B. Brood Year 1996 chinook salmon run timing for Pahsimeroi Fish Hatchery.



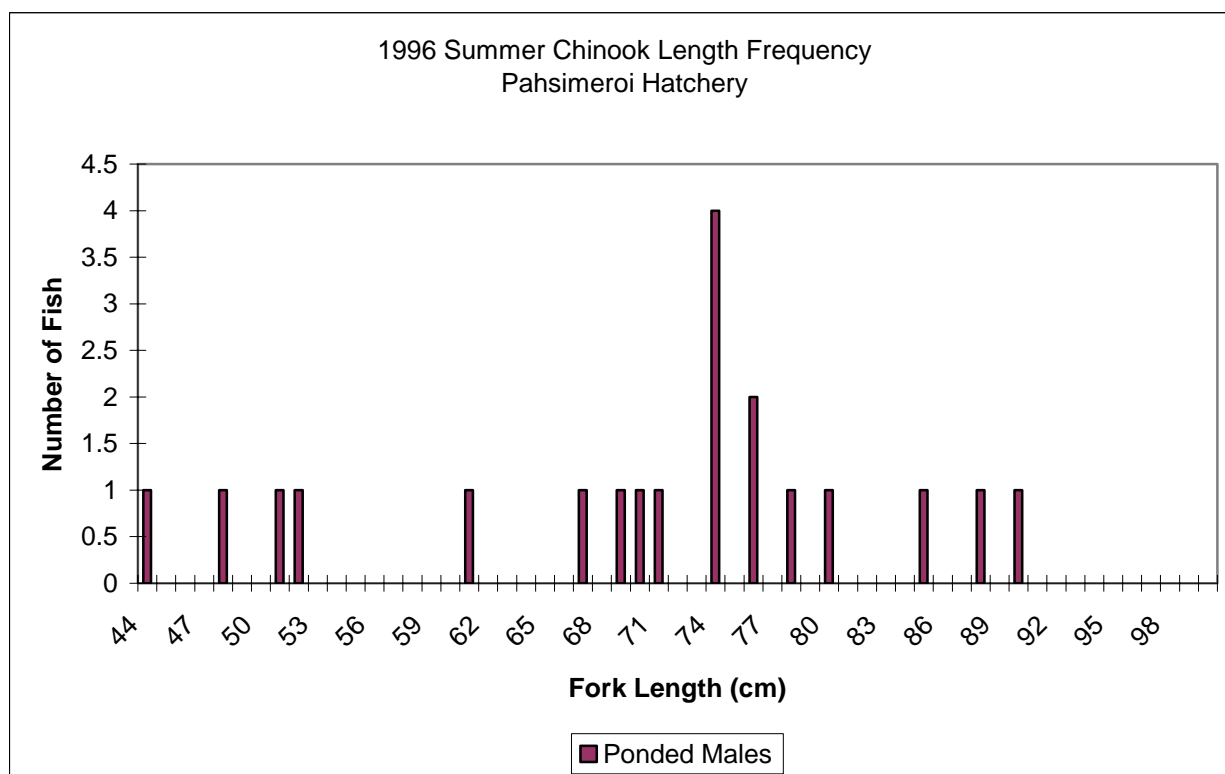
Appendix C. Length Frequency of male chinook for Pahsimeroi Fish Hatchery BY96.

Males Length Frequency Distribution					
Total Trapped	AD-clip Poned	LV-Clip Poned	RV-clip Poned	No-clip Released	LV-clip Released
Fork Length	Fork Length	Fork Length	Fork Length	Fork Length	Fork Length
44 1	44	44	44 1	44	44
45	45	45	45	45	45
46	46	46	46	46	46
47	47	47	47	47	47
48 1	48	48	48 1	48	48
49	49	49	49	49	49
50	50	50	50	50	50
51 1	51	51	51 1	51	51
52 1	52	52	52 1	52	52
53 1	53	53	53	53 1	53
54 1	54	54	54	54 1	54
55 1	55	55	55	55 1	55
56	56	56	56	56	56
57	57	57	57	57	57
58	58	58	58	58	58
59	59	59	59	59	59
60 1	60	60	60	60 1	60
61	61 1	61	61	61 1	61
62 2	62	62	62	62	62
63 2	63	63	63	63 2	63
64	64	64	64	64	64
65	65	65	65	65	65
66	66	66	66	66	66
67 2	67	67	67 1	67 1	67
68 3	68	68	68	68 2	68 1
69 2	69 1	69	69	69 1	69
70 2	70 1	70	70	70 1	70
71 2	71 1	71	71	71 1	71
72 1	72	72	72	72 1	72
73 4	73	73	73	73 3	73 1
74 4	74 3	74 1	74	74	74
75	75	75	75	75	75
76 3	76 2	76	76	76 1	76
77 1	77	77	77	77 1	77
78 3	78 1	78	78	78 2	78
79 2	79	79	79	79 2	79
80 3	80 1	80	80	80 2	80
81	81	81	81	81	81
82 1	82	82	82	82 1	82
83 1	83	83	83	83 1	83
84 1	84	84	84	84 1	84
85 2	85 1	85	85	85 1	85
86 2	86	86	86	86 2	86
87 1	87	87	87	87 1	87
88 2	88 1	88	88	88 1	88
89	89	89	89	89	89
90 2	90 1	90	90	90 1	90
91	91	91	91	91	91
92	92	92	92	92	92
93	93	93	93	93	93
94	94	94	94	94	94
95 1	95	95	95	95 1	95
96	96	96	96	96	96
97	97	97	97	97	97
98	98	98	98	98	98
99 1	99	99	99	99 1	99
100	100	100	100	100	100
Total Trapped 58	AD-clip Poned 14	LV-Clip Poned 1	RV-clip Poned 5	No-clip Rel 36	LV-clip Rel 2

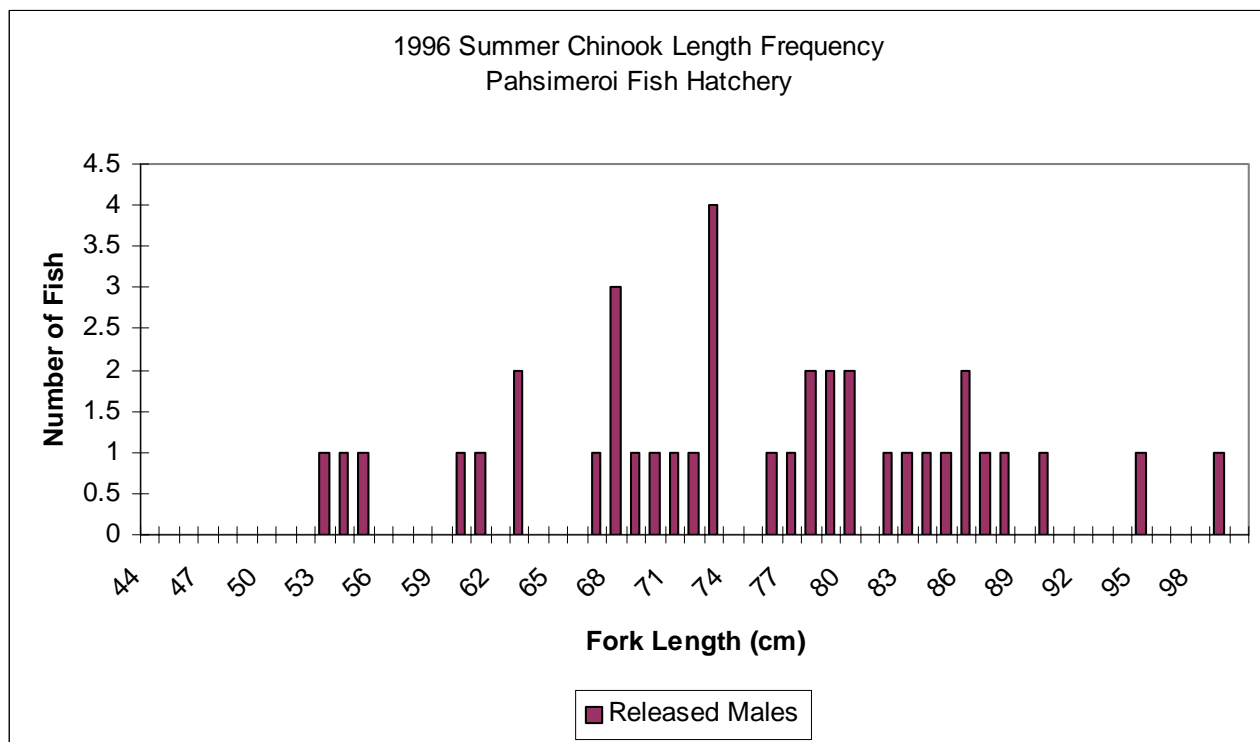
Appendix C-1. Length Frequency total males trapped at Pahsimeroi Fish Hatchery.



Appendix C-2. Length frequency ponded males at Pahsimeroi Fish Hatchery.



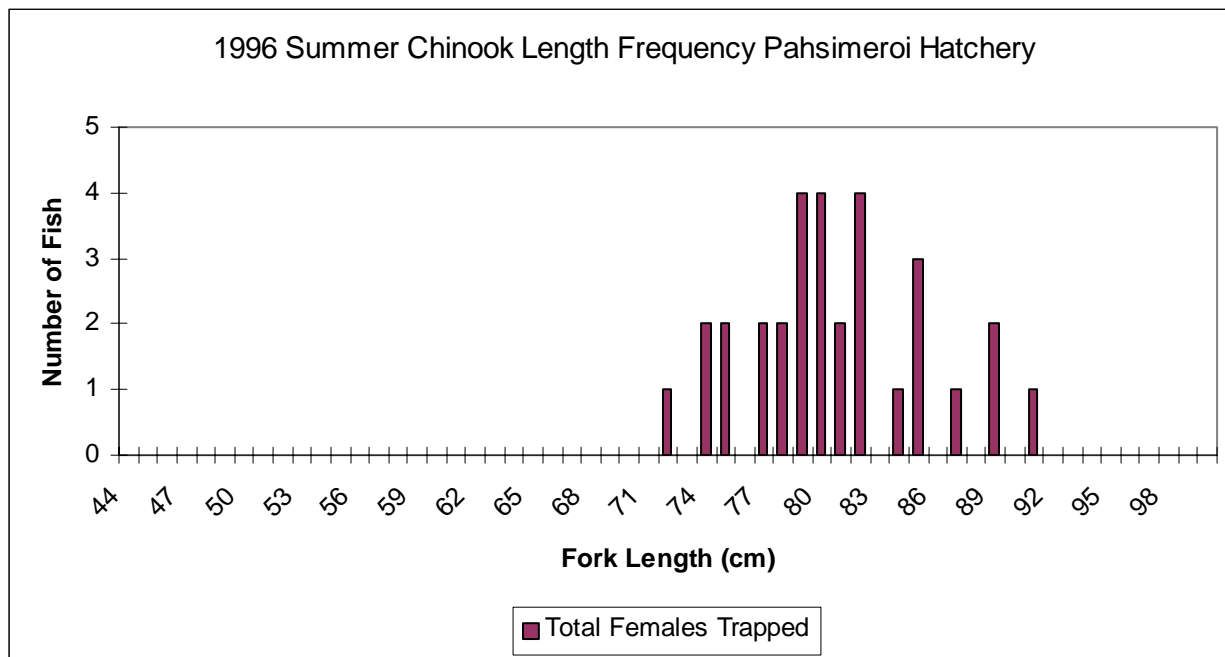
Appendix C-3. Length frequency released males at Pahsimeroi Fish Hatchery.



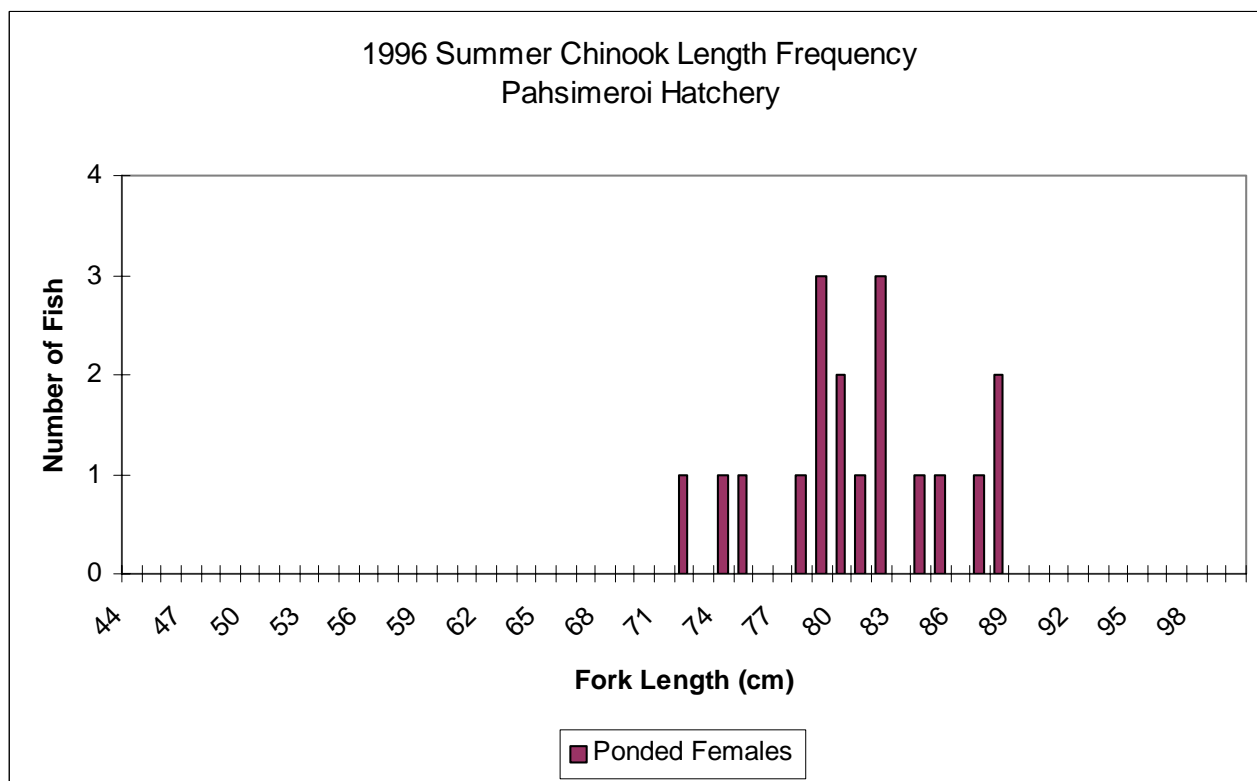
Appendix D. Length Frequency of female chinook at Pahsimeroi Fish Hatchery.

Females Length Frequency Distribution				
Total Trapped	AD-clip Poned	LV-Clip Poned	No-clip Released	LV-clip Released
Fork Length	Fork Length	Fork Length	Fork Length	Fork Length
44	44	44	44	44
45	45	45	45	45
46	46	46	46	46
47	47	47	47	47
48	48	48	48	48
49	49	49	49	49
50	50	50	50	50
51	51	51	51	51
52	52	52	52	52
53	53	53	53	53
54	54	54	54	54
55	55	55	55	55
56	56	56	56	56
57	57	57	57	57
58	58	58	58	58
59	59	59	59	59
60	60	60	60	60
61	61	61	61	61
62	62	62	62	62
63	63	63	63	63
64	64	64	64	64
65	65	65	65	65
66	66	66	66	66
67	67	67	67	67
68	68	68	68	68
69	69	69	69	69
70	70	70	70	70
71	71	71	71	71
72 1	72 1	72	72	72
73	73	73	73	73
74 2	74 1	74	74 1	74
75 2	75 1	75	75 1	75
76	76	76	76	76
77 2	77	77	77 2	77
78 2	78 1	78	78 1	78
79 4	79 3	79	79 1	79
80 4	80 2	80	80 2	80
81 2	81 1	81	81 1	81
82 4	82 2	82 1	82 1	82
83	83	83	83	83
84 1	84 1	84	84	84
85 3	85	85 1	85 2	85
86	86	86	86	86
87 1	87 1	87	87	87
88	88 2	88	88	88
89 2	89	89	89	89
90	90	90	90	90
91 1	91	91	91 1	91
92	92	92	92	92
93	93	93	93	93
94	94	94	94	94
95	95	95	95	95
96	96	96	96	96
97	97	97	97	97
98	98	98	98	98
99	99	99	99	99
100	100	100	100	100
Total Trapped 31	AD-clip Poned 16	LV-Clip Poned 2	No-clip Rel 13	LV-clip Rel 0

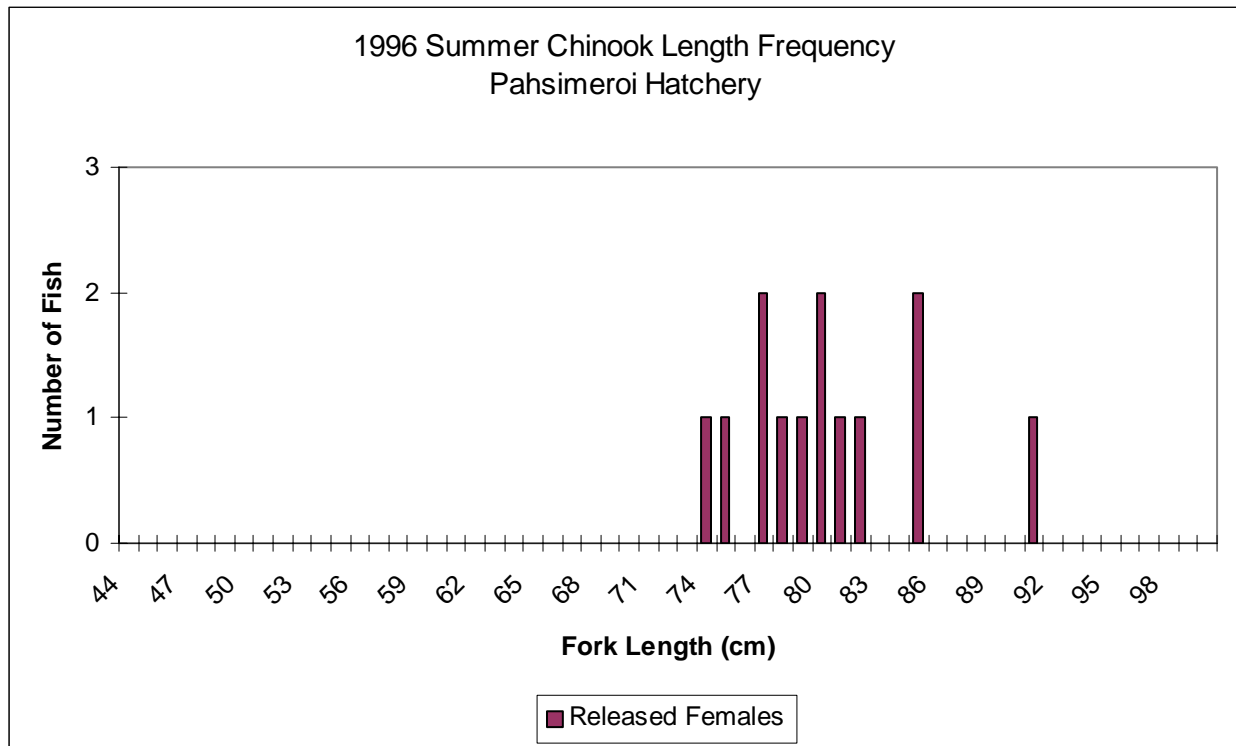
Appendix D-1. Length frequency total females trapped t Pahsimeroi Fish Hatchery.



Appendix D-2. Length frequency ponded females at Pahsimeroi Fish Hatchery.



Appendix D-3. Length frequency released females at Pahsimeroi Fish Hatchery.



Appendix E. Brood Year 1996 summer chinook egg incubation record for Pahsimeroi Fish Hatchery.

Lot No.	Spawn Date	Female No.	Stack	Eyed	Pick-Off	Green	TU's	%Eye-up	Egg Tube	Disease KID	VIRO	Egg Distribution
1	26-Aug-96	0049A	1	3,464	203	3,667	713	94.46%	169,170	Neg	Neg	Sawtooth 9/27 retained
	26-Aug-96	0060A	2	2,243	775	3,018	713	74.32%	N/A	Neg	Neg	
2	03-Sep-96	014A	3	3,818	549	4,367	552	87.43%	171,172	Low +	Neg	Sawtooth 9/27
	03-Sep-96	005A	4	5,262	173	5,435	552	96.82%	173,174	Low+	Neg	Sawtooth 9/27
	03-Sep-96	026A	5	4,564	698	5,262	552	86.74%	175,176	Neg	Neg	Sawtooth 9/27
3	05-Sep-96	062A	6	4,635	138	4,773	667	97.11%	37,38	Neg	Neg	Sawtooth 10/4
4	09-Sep-96	050A	7	4,371	237	4,608	575	94.86%	39,40	Neg	Neg	Sawtooth 10/4
	09-Sep-96	35A	8	5,004	196	5,200	575	96.23%	41,42	Neg	Neg	Sawtooth 10/4
	09-Sep-96	039A	9	3,340	370	3,710	575	90.03%	43,44	Neg	Neg	Sawtooth 10/4
5	12-Sep-96	042A	10	5,099	460	5,559	625	91.73%	45,46	Low +	Neg	Sawtooth 10/8
	12-Sep-96	028A	11	4,266	235	4,501	625	94.78%	47,48	Neg	Neg	Sawtooth 10/8
6	16-Sep-96	032A	1	4,693	249	4,942	529	94.96%	N/A	Neg	Neg	Sawtooth 10/11
	16-Sep-96	066A	2	5,318	537	5,855	529	90.83%	N/A	Neg	Neg	Sawtooth 10/11
	16-Sep-96	051A	3	5,211	132	5,343	529	97.53%	N/A	Neg	Nwg	Sawtooth 10/11
7	23-Sep-96	0045A	4	4,866	85	4,951	483	98.28%	85,86	Low +	Neg	Sawtooth 10/16
	23-Sep-96	0040A	5	5,032	134	5,166	483	97.41%	87,88	Neg	Neg	Sawtooth 10/16
8	26-Sep-96	0053A	1	4,592	150	4,742	462	96.84%	71,72	Neg	Neg	Sawtooth 10/18
9	01-Oct-96	0054A	3	4,365	196	4,561	550	95.70%	Bucket	Neg	Neg	Sawtooth 10/23
<b>Totals</b>				<b>80,143</b>	<b>5,517</b>	<b>85,660</b>		<b>93.56%</b>				

Appendix F. Brood Year 1996 feed summary for Pahsimeroi Fish Hatchery.

<b>Bioproducts Feed Size</b>	<b>Lb.s Fed This Month</b>	<b>Lbs. To Date</b>	<b>Prices Through 12/31/96 Cost per Pound</b>	<b>Total Cost To Date</b>
#2 Start Bio Diet		44.0	\$1.00	\$44.10
#3 Start Bio Diet		88.0	\$1.00	\$88.20
1.0 MM BD Grower		176.0	\$0.77	\$134.82
1.3 MM BD Grower		220.0	\$0.74	\$162.80
1.5 MM AQM-100 Grower		221.0	\$1.54	\$340.34
1.5 MM BD Grower		265.0	\$0.67	\$177.55
2.5 MM BD Grower		397.0	\$1.54	\$611.38
AQM-100 2.5 MM BD Grower		838.0	\$0.63	\$527.94
3.0 MM BD Grower		2,766.0	\$0.63	\$1,742.58
3.0 MM BD Grower AQM-100		529.0	\$1.54	\$814.66
3.0 MM BD Grower TM-100		2,114.0	\$1.25	\$2,636.16
3.0 MM Bio-Moist Feed		7,000.0	\$0.19	\$1,302.00
<b>TOTAL</b>	<b>0.00</b>	<b>14,658.00</b>		<b>\$8,582.53</b>

# Appendix G. Pathology fish health report for Pahsimeroi Fish Hatchery 1996.

## Summary of Fish Autopsy

ACCESSION NO:	98-46	LOCATION:	ph
SPECIES:	su	AUTOPSY DATE:	3/4/1998
STRAIN:	pah	AGE:	juv
UNIT:	P1	SAMPLE SIZE:	20
RIVER FOR AUTOPSY:	Prelib.		
INVESTIGATOR(S):	Munson		
REMARKS:	Blood parameters not assayed		

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
LENGTH	0.00	0.00	0.00
WEIGHT	0.00	0.00	0.00
KTL*	0.00	0.00	0.00
CTL*	0.00	0.00	0.00
HEMATOCRIT	0.00	0.00	0.00
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	0.00	0.00	0.00

\*EXPRESSED AT KTL TIMES 10 TO THE FIFTH POWER

\*\*CONVERTED FROM KTL; EXPRESSED AS CTL TIMES 10 TO FOURTH POWER

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		FAT		MESEN. SPLEEN		GUT		HIND KIDNEY		LIVER		BILE	
N	20	N	20	N	20	0	20	0	0	B	0	0	20	N	20	A	20	0	0
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	0	1	0
B2	0	C	0	L	0	2	0	2	5	G	0	2	0	M	0	C	0	2	0
E1	0	M	0	S&L	0			3	9	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	5	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			O	0			Mean=3.25								OT	0		
M1	0																		
OT	0																		

## SUMMARY OF NORMALS

20	20	20	20	20	20	20	20	20	20	0
SEX	M: 0		F: 0		U: 0					

## GENERAL REMARKS:

FINS: GONADS:

SKIN: OTHER:

Appendix H. Brood Year 1996 production Costs for Pahsimeroi Fish Hatchery.

<b>Number of fish</b>	<b>Pounds of feed fed</b>	<b>Cost of Feed</b>	<b>Pounds of Fish</b>	<b>Conversion</b>	<b>Total Budget*</b>	<b>Cost per Thousand Fish</b>	<b>Cost per Pound of Fish</b>
65,648	14,658	\$8,582.53	5,914	2.50	\$472,870.00	\$7,203.11	\$79.95

\* Does not include capital outlay

Appendix I. Brood year 1996 egg to smolt survival by life stage at Pahsimeroi Fish Hatchery.

<b>Life Stages</b>	<b>Numbers</b>	<b>Survival Percentages</b>
Green Eggs	85,660	
Egg Pickoff	5,517	
Eye Eggs	80,143	94
Alevin Pickoff	4,641	
Fry Poned	75,502	88
Fry Mortality	9,719	
Fingerling Poned	65,783	77
Fingerling Mortality	135	
Smolts Released	65,648	77

Appendix J. Pahsimeroi Fish Hatchery chinook release and return information.

<b>Date Released</b>	<b>Number</b>	<b>3-yrs</b>	<b>4-yrs</b>	<b>5-yrs</b>	<b>Total</b>	<b>Year of Return %</b>	<b>Return</b>
May 1970	300,000	89	N/A	101	N/A	71,72,73	N/A
May 1971	250,000	40	425	14	479	72,73,74	0.192
May 1972	250,000	20	138	76	234	73,74,75	0.094
May 1973	347,000	1	5	32	38	74,75,76	0.011
May 1974	330,000	8	189	436	633	75,76,77	0.192
May 1975	114,000	53	115	X	X	76,77,78	X
May 1976	121,000	7	X	32	X	77,78,79	X
May 1977	235,000	X	0	4	X	78,79,80	X
May 1978	218,000	1	29	13	43	79,80,81	0.020
Mar 1983	13,690	11	72	30	113	84,85,86	0.825
Apr 1984	55,800	27	278	52	357	85,86,87	0.640
Apr 1985	209,155	37	408	716	1,161	86,87,88	0.555
Mar 1986	12,095	13	47	31	91	87,88,89	0.752
Mar 1987	258,600	75	180	42	297	88,89,90	0.115
Mar 1988	598,500	135	389	79	603	89,90,91	0.101
Mar 1989	1,016,400	39	139	27	205	90,91,92	0.020
Mar 1990	1,058,000	20	98	119	237	91,92,93	0.022
Mar 1991	227,500	6	37	1	44	92,93,94	0.019
Mar 1992	605,900	13	26	0	39	93,94,95	0.006
Apr 1993	375,000	7	73	8	88	94,95,96	0.023
Apr 1994	130,510	7	27	9	43	95,96,97	0.033
Apr 1995	147,429	5	60		65	96,97,98	
Apr 1996	0 No 1994 Brood Year Production				N/A		
Apr 1997	122,017					98,99,00	
Apr 1998	65,648					2000,01,02	

**Submitted by:**

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Fish Hatchery Manager I

Douglas Engemann  
Assistant Fish Hatchery Manager

**Approved by:**

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Bureau of Fisheries

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Tom Rogers  
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